

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

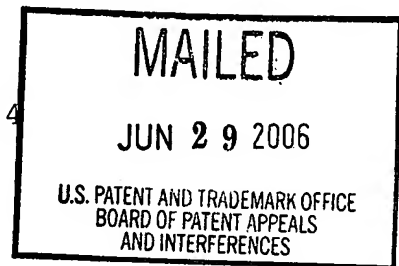
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID S. DE LORENZO, STEPHEN W. MONTGOMERY
WARREN R. MORROW and ROBIN STEINBRECHER

Appeal No. 2006-1056
Application No. 10/606,514

ON BRIEF



Before HAIRSTON, KRASS, and BLANKENSHIP, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-7, 13-19, and 25-31. Claims 8-12, 20-24, and 32-36 have been indicated by the examiner as being drawn to allowable subject matter and are not on appeal before us.

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The invention pertains to a system for thermal management of devices, including memory devices, best illustrated by reference to representative independent claim 1, reproduced as follows:

1. An apparatus, comprising:

a device having a thermal characteristic which is dependent on a number of times the device is accessed over a period of time; and

a controller connected to the device and adapted to control access to the device,

wherein the controller is adapted to calculate a temperature estimate of the device and to control access to the device in accordance with the calculated temperature estimate.

The examiner relies on the following reference:

Nizar et al. (Nizar) 6,470,238 Oct. 22, 2002

Claims 1-7, 13-19, and 25-31 stand rejected under 35 U.S.C. § 102(e) as anticipated by Nizar.

Reference is made to the briefs and answer for the respective positions of appellants and the examiner.

OPINION

A rejection for anticipation under section 102 requires that the four corners of a single prior art document describe every element of the claimed invention, either expressly or inherently,

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such that a person of ordinary skill in the art could practice the invention without undue experimentation. In re Paulsen, 30 F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994).

With regard to independent claim 1, the examiner applies Nizar to the claimed subject matter as follows:

Column 12, lines 8-44, for "a device having a thermal characteristic which is dependent on a number of times the device is accessed over a period of time."

Column 11, line 52, through column 12, line 2, and Figures 1a or 2A for "a controller connected to the device and adapted to control access to the device."

Column 11, line 52, through column 12, line 2 for "wherein the controller is adapted to calculate a temperature estimate of the device and to control access to the device in accordance with the calculated temperature estimate."

Appellants argue that Nizar fails to teach or suggest the features related to calculating a temperature estimate of the device and controlling access to the device in accordance with the calculated temperature estimate. In particular, appellants contend that the cited portion of Nizar (column 11-column 12) is

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devoid of any express mention of a calculated temperature estimate, with the statement that "package and die temperatures can be predicted" not describing any actual calculation of a temperature estimate. Rather, argue appellants, this recitation does not refer to any actual calculation, but only to the well known use of power dissipation as a proxy for thermal management of devices. See page 3 of the principal brief.

To whatever extent the examiner is relying on Nizar's recitation of "summing the power dissipated," appellant argues that Nizar "teaches only calculating an accumulated power dissipated, which is different from and does not identically describe the recited calculated temperature estimate" (principal brief-page 4). Appellants contend that while the temperature of the package and die in Nizar has some relationship to the sum of the power dissipation, the predicted package/die temperature is not identical to the sum of the dissipated power. "Rather, some other calculation would have to be made to arrive at a predicted temperature based on the sum" (principal brief-page 4).

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Moreover, appellants argue, Nizar "further fails to identically describe controlling access to the device using the 'predicted temperature'" (principal brief-page 4). Rather, the cited portion of Nizar, although mentioning controlling an access rate when a certain amount of I/O traffic is reached, does not teach or suggest using the predicted temperature to control access to the device. "[T]he controller described in Nizar controls access to the package/die based on the throttle counter limit and a determined maximum amount of traffic, and not based on any calculated temperature estimate" (principal brief-page 5).

We have reviewed the evidence before us, including, inter alia, the disclosure of Nizar and the arguments by appellants and the examiner, and we conclude that the subject matter of instant claim 1 is anticipated by Nizar, within the meaning of 35 U.S.C. § 102(e).

Nizar describes a method of determining access rate to a component, comparing the access rate with a predetermined access rate, and controlling the temperature of the component through some corrective action. Thus, at first glance, it would appear

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that Nizar controls the temperature of a device by comparing access rates and that this is different from the instant invention wherein a temperature is calculated and access to a device is controlled in accordance with the calculated temperature.

However, Nizar describes several different embodiments. The process of "throttling" is described at column 2, lines 14-19, of Nizar, as well as in paragraph [0003] of the instant specification. A "throttling" function occurs when an access rate causes excessive temperatures. When this occurs, the access rate is slowed down, or activity level is reduced (or "throttled") for a period of time in order to guarantee that a component's thermal specification is not exceeded.

In one embodiment, Nizar describes a monitoring of the temperature of the device by the throttling logic. If the device is approaching its thermal specification, the throttling logic transitions to the throttle state (see column 3, lines 10-15, of Nizar).

Thus, applying the Nizar teaching to the language of instant claim 1, Nizar clearly describes a device having a thermal characteristic that is dependent on a number of times the device is accessed over a period of time. See column 2, lines 1-19, of Nizar, where it is explained that the device has a thermal specification and that access rates may cause excessive temperatures.

A controller connected to the device and adapted to control access to the device is described in Nizar as component 100 which may be a controller for a memory device (see column 2, lines 36-50, of Nizar).

Since column 3, lines 10-15, of Nizar describes the monitoring of temperature and determining that the temperature is approaching the thermal specification (in our view, the "determining" step is a calculation step, as broadly claimed), there is a calculation of a temperature estimate of the device in Nizar. Further, that calculated temperature estimate, i.e., an estimate that the temperature is approaching the predetermined thermal specification, is used to control access to the device

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because a determination that this calculated temperature estimate is approaching or has exceeded the thermal specification causes a transition to the throttle state, i.e., access is slowed down, or "controlled."

Thus, in our view, all of the limitations of instant claim 1 are met by Nizar.

Alternatively, as cited by the examiner, columns 11-12 of Nizar describe the prediction (i.e., "estimate") temperature of the device by "summing" the power dissipated by various I/O interfaces and then, based on calculations, it may be determined that when a certain access speed is exceeded, the device temperature limits are reached.

Appellants argue that a statement in the reference that "package and die temperatures can be predicted" (column 11, line 55) does not describe any actual calculation of a temperature estimate (principal brief-page 3). However, the claimed "calculate a temperature estimate" is very broad, in that a "determination" of a temperature may also be a calculation. Thus, the determination of a temperature at column 3, lines 10-15, of Nizar may be a calculation of a temperature estimate.

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Moreover, as explained by the examiner, the prediction of a temperature (i.e., a temperature estimate) may be "calculated" by summing the power dissipated by I/O devices. While power dissipation, per se, is not equivalent to temperature, even appellants admit (principal brief-page 4) that the temperature of Nizar's device "has some relationship to the sum of the power dissipation." Although appellants argue that power dissipation is not "identical" (principal brief-page 4) to device temperature, since the temperature is proportional to, or rather has a predetermined relationship to, the power dissipation, the calculation of power dissipation, which Nizar clearly suggests, is also a determination, or "calculation" of a temperature estimate, as claimed.

Appellants argue that Nizar fails to describe controlling access to the device using the "predicted temperature." However, since throttling is applied, based on the calculation of power dissipation, and power dissipation is directly related to temperature of the device, and throttling controls the access to the device, e.g., by reducing activity, Nizar does, indeed, control access to the device using the "predicted temperature."

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Since we find that Nizar does disclose the claimed subject matter as broadly recited in the independent claims, we will sustain the rejection of claims 1, 13, and 25 under 35 U.S.C. § 102(e).

With regard to claims 2, 14, and 26, the examiner refers to the cover figure, and column 1, lines 29-32, of Nizar for a controller adapted to receive an access request; column 2, lines 1-14, and column 12, lines 3-28, for calculating the temperature estimate in accordance with the access request; and column 5, lines 50-63, and column 3, lines 4-25, for determining if the temperature estimate exceeds a temperature threshold, and imposing an access request budget if the temperature estimate exceeds the temperature threshold. See page 4 of the answer.

At pages 6-10 of the principal brief, appellants contend that the examiner has not clearly set forth the reasoning anent the rejection of claims 2, 14, and 26. We disagree.

The examiner has pointed to the cover figure of Nizar, where an access request is received (see access request 106). The calculation of the temperature estimate in accordance with the

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access request is found in either column 3, lines 10-15, of Nizar, describing the monitoring of temperature and determining that the temperature is approaching the thermal specification, or the "summing" of dissipated power, such dissipated being proportional to the temperature estimate, for the reasons supra, with regard to the independent claims.

Nizar clearly teaches determining if a temperature estimate exceeds a temperature threshold. See column 3, lines 10-15, where Nizar describes monitoring the temperature of the device to determine if it is approaching, or is "outside" (e.g., exceeds) its thermal specification.

If the temperature estimate exceeds the thermal specification in Nizar, then a throttle state for reducing access is initiated, i.e., an access request budget is imposed.

Thus, we find that Nizar does describe each and every element of claims 2, 14, and 26, and we will sustain the rejection of these claims under 35 U.S.C. § 102(e).

With regard to claims 3, 15, and 27, these claims recite the processing of the access request without an access request budget if the temperature estimate does not exceed the temperature threshold.

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While appellants assert that the examiner is not clear as to how the reference is being applied against the claims, in our view, these claims are merely saying that if the temperature is not in excess of a certain threshold, then access requests need not be controlled, i.e., reduced, so the access requests need not be processed with an access request budget, which would reduce the number of accesses in order to reduce the temperature of the device. Nizar clearly discloses the relationship between the number of accesses and the temperature of the device, where no control over the number of accesses is asserted if the device is in no danger of exceeding its thermal specification. That is, no budgeting of accesses is required unless there is a danger of exceeding the thermal specification of the device.

Accordingly, we will sustain the rejection of claims 3, 15, and 27 under 35 U.S.C. § 102(e).

Regarding claims 4, 16, and 28, these claims recite the counterpart of what is recited in claims 3, 15, and 27. That is, the request is processed in accordance with the imposed access

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request budget if the temperature estimate exceeds the temperature threshold. Clearly, in Nizar, if the thermal specification of the device is exceeded, restrictions on access requests (throttling) are imposed.

Thus, we will sustain the rejection of claims 4, 16, and 28 under 35 U.S.C. § 102(e).

Claims 5, 17, and 29 require the calculation of a "new" access request budget each time the access request budget is imposed and claims 6, 18, and 30 require the calculation of a "new" access request budget "periodically". The examiner points to column 8, lines 63-65 of Nizar for such a teaching. However, this portion of Nizar merely mentions that a budget is allocated for "each and every read throttling monitoring window." We find nothing therein relative to modifying an "access request budget."

While Nizar does appear to disclose an access request budget imposed when the thermal specification of the device is approached or exceeded, the examiner has indicated nothing in Nizar suggestive of modifying this "budget" each time the access request budget is imposed or even periodically.

Accordingly, we will not sustain the rejection of claims 5, 17, 18, 29 and 30 under 35 U.S.C. § 102(e). It follows, then,

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that we also will not sustain the rejection of dependent claims 7, 19, and 31 under 35 U.S.C. § 102(e).

CONCLUSION


We have sustained the rejection of claims 1-4, 13-16, and 25-28 under 35 U.S.C. § 102(e), but we have not sustained the rejection of claims 5-7, 17-19, and 29-31 under 35 U.S.C. § 102(e).


Accordingly, the examiner's decision is affirmed-in-part.


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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 C.F.R.
§ 1.136(a)(1)(iv).

AFFIRMED-IN-PART


KENNETH W. HAIRSTON)
Administrative Patent Judge)


ERROL A. KRASS) BOARD OF PATENT
Administrative Patent Judge) APPEALS AND


HOWARD B. BLANKENSHIP) INTERFERENCES
Administrative Patent Judge)

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